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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,786	12/07/2000	Satoshi Mikami	N00230US	8900

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MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
CHAN, ALEX H	
ART UNIT	**PAPER NUMBER**
2633	5

DATE MAILED: 09/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/730,786	MIKAMI, SATOSHI	
	Examiner	Art Unit	
	Alex H Chan	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because it is not in a single paragraph format. Correction is required. See MPEP § 608.01(b).

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Uni-directional and Bi-directional optical communication system having transmission line compensating device based on a control signal to generate control light which causes Raman amplification effect.

3. Claim 9 is objected to because of the following informalities: "sid back stage" is used where "said back stage" might have been intended.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-12, 14-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,292,288 to Akasaka et al (hereinafter referred to as Akasaka) in view of U.S. Patent No. 6,229,936 B1 to Kosaka et al (hereinafter referred to as Kosaka).

Regarding claim 1, Akasaka discloses an optical communication system (Col. 1, lines 9-16) for amplifying an optical signal (e.g. signal of Fig. 1) propagating through an optical

transmission line (12 of Fig. 1) by using an EDFA (optical amplifier) (10 of Fig. 10) in an optical repeater (Fig. 10) and emitting an amplified optical signal (e.g. via EDFA, 10 of Fig, 10) to an optical transmission line mounted at a back stage (Fig. 34). Though he discloses a Raman amplifier (transmission line compensating device) (Fig. 1) to generate a pumping light for producing a Raman amplification effect (Col. 3, lines 36-67- Col. 4, lines 1-20), he fails to disclose that the Raman amplifier (transmission line compensating device) generates a control light based on a control signal superimposed on optical signal.

Kosaka discloses an optical transmission equipment (transmission line compensating device) (100 of Fig. 1) having a main optical signal and an optical supervising signal (control signal) which are multiplexed (superimposed) (Col. 6, lines 1-5 & line 37) for generating the monitor information so as to be used for controlling the optical pump light source (control light) (Col. 7, lines 5-34). Accordingly, one of ordinary skill in the art would have been motivated to incorporate an optical transmission equipment for controlling the optical pump light source based on optical supervising signal because the monitor information generated by the optical transmission equipment (e.g. via supervisory/controller portion, 50 of Fig. 1) contains information instructing change of amplification factor of the optical amplifier (Col. 7, lines 19-22). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Raman amplification method of Akasaka by substituting a control light as taught by Kosaka in place of a pumping light because Kosaka suggests, in Col. 3, lines 49-57, that with this construction, the feeble optical signal, which is weakened on the transmission path due to propagation, is amplified without deterioration in the noise figure while optical fibers for amplifying are pumped, thereby achieving an optical

transmission equipment being economical and small-sized with a low electric power consumption.

Regarding claim 2, Akasaka in view of Kosaka discloses a Raman amplifier (transmission line compensating device) (Akasaka, 9 of Fig. 35) is so configured as to send control light (e.g. Kosaka, controlled light emitted by 2 of Fig. 1) to an optical transmission line (e.g. 8 of Fig. 35) mounted at a front stage (Akasaka, Fig. 35).

Regarding claim 3, Akasaka in view of Kosaka discloses a Raman amplifier (transmission line compensating device) (Akasaka, 9 of Fig. 34) is so configured as to send control light (e.g. Kosaka, controlled light emitted by 2 of Fig. 1) to an optical transmission line (e.g. Akasaka, 8 of Fig. 34) mounted at said back stage (Akasaka, Fig. 34).

Regarding claim 4, Akasaka in view of Kosaka discloses a Raman amplifier (transmission line compensating device) (e.g. Akasaka, 9 of Fig. 7) that is mounted inside optical repeater (Fig. 7).

Regarding claim 5, Akasaka in view of Kosaka does not disclose that the transmission line compensating device is separately and individually outside optical repeater. However, due to lack of criticality, to shift location of prior art parts and its function does not make the claimed invention patentable over that prior art. (Case Law, In re Japikse, 86 USPQ 70). Also, to make prior art parts separable does not make the claimed invention patentable over that prior art (Case Law, Nerwin v. Erlichman, 168 USPQ 177).

Regarding claim 6, Akasaka in view of Kosaka discloses all limitations as discussed above, and further discloses a Raman amplifier (transmission line compensating device) that includes a series of light sources (i.e. two or more control light sources) (Akasaka, pumping light

sources of Fig. 60) to generate control light having a different frequency (wavelength) (e.g. 1ch has 211 THz, 2ch has 210 THz, 3ch has 209 THz) and output and an Mach-Zehnder wavelength combiner (optical multiplexer) (Akasaka, Wave Combiner of Mach-Zehnder Style of Fig. 60) to multiplex control light fed from pumping light sources (Akasaka, Col. 4, lines 9-20).

Regarding claims 7-12 and 20-25, the limitations introduced by claims 7-12 and 20-25 correspond to the limitations introduced by claims 1-6, respectively. The treatment of claims 1-6 above reads on the corresponding limitations of claims 7-12 and 20-25. In addition, there is one limitation that is disclosed in claims 7 and 20; that is the optical signal propagating through an upward transmission line or a downward transmission line. Akasaka discloses a downward transmission line (Fig. 1).

Regarding claims 14-19, the limitations introduced by claims 14-19 correspond to the limitations introduced by claims 1-6, respectively. The treatment of claims 1-6 above reads on the corresponding limitations of claims 14-19.

6. **Claims 7-13 and 20-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,075,633 to Deguchi et al (hereinafter referred to as Deguchi) in view of Kosaka and further in view of Akasaka.

Regarding claim 7, Deguchi discloses a light transmission system (optical communication system) for amplifying an optical signal propagating through an upward transmission line (e.g. From Terminal Equipment A of Fig. 4) or a downward transmission line (e.g. From Terminal Equipment B of Fig. 4) by using a corresponding optical amplifier (15A for upward and 15B for downward, Fig. 4) in an optical repeater (1-1 of Fig. 4) and sending an optical main signal (amplified optical signal) (3 of Fig. 4) to an upward transmission line or a

downward transmission line mounted at a back stage. However, he fails to disclose transmission line compensating devices each operating for upward transmission line or downward transmission line and each generating, based on a control signal superimposed on optical signal, control light which causes a Raman amplification effect in optical transmission lines.

Kosaka discloses an optical transmission equipment (transmission line compensating device) (Kosaka, 100 of Fig. 1) having a main optical signal and an optical supervising signal (control signal) which are multiplexed (superimposed) (Kosaka, Col. 6, lines 1-5 & line 37) for generating the monitor information so as to be used for controlling the optical pump light source (i.e. controlled light is then emitted by optical pump light source) (Kosaka, Col. 7, lines 5-34). Kosaka fails to claim that control light causes a Raman amplification effect in the optical transmission line.

Akasaka discloses a control means (4 of Fig. 1) for controlling the pump power (e.g. via controlled pumping light emitted by pumping means controlled by control means) which causes a Raman amplification effect (Col. 9, lines 30-37 & Col. 26, lines 56-67) by stimulated Raman scattering in optical transmission lines.

Accordingly, one of ordinary skill in the art would have been motivated to incorporate the above cited means in order to provide a Raman amplification method capable of uniformly amplifying wavelength division multiplexing signals and suitable to be incorporated as a unit (Akasaka, Col. 4, lines 23-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the light transmission system of Deguchi by inserting a transmission line compensating device for each the upward and downward transmission line for generating, base on a control light superimposed on an optical

signal, control light which causes a Raman amplification effect in the optical transmission lines as taught by Kosaka in view of Akasaka to provide a Raman amplification method capable of uniformly amplifying wavelength division multiplexing signals and suitable to be incorporated as a unit.

Regarding claim 8, Deguchi in view of Kosaka and Akasaka discloses a Raman amplifier (transmission line compensating device) (Akasaka, 9 of Fig. 35) is so configured as to send control light (e.g. Kosaka, controlled light emitted by 2 of Fig. 1) to an optical transmission line (e.g. 8 of Fig. 35) mounted at a front stage (Akasaka, Fig. 35).

Regarding claim 9, Deguchi in view of Kosaka and Akasaka discloses a Raman amplifier (transmission line compensating device) (Akasaka, 9 of Fig. 34) is so configured as to send control light (e.g. Kosaka, controlled light emitted by 2 of Fig. 1) to an optical transmission line (e.g. 8 of Fig. 34) mounted at said back stage (Akasaka, Fig. 34).

Regarding claim 10, Deguchi in view of Kosaka and Akasaka discloses a Raman amplifier (transmission line compensating device) (Akasaka, 9 of Fig. 7) that is mounted inside optical repeater (Akasaka, Fig. 7).

Regarding claim 11, Deguchi in view of Kosaka and Akasaka does not disclose that the transmission line compensating device is separately and individually outside optical repeater. However, due to lack of criticality, to shift location of prior art parts and its function does not make the claimed invention patentable over that prior art. (Case Law, In re Japikse, 86 USPQ 70). Also, to make prior art parts separable does not make the claimed invention patentable over that prior art (Case Law, Nerwin v. Erlichman, 168 USPQ 177).

Regarding claim 12, Deguchi in view of Kosaka and Akasaka discloses all limitations as discussed above, and further discloses a Raman amplifier (transmission line compensating device) that includes a series of light sources (two or more control light sources) (Akasaka, Fig. 60) to generate control light having a different frequency (wavelength) (e.g. 1ch has 211 THz, 2ch has 210 THz, 3ch has 209 THz) and output and an Mach-Zehnder wavelength combiner (optical multiplexer) (Akasaka, Wave Combiner of Mach-Zehnder Style of Fig. 60) to multiplex control light fed from pumping light sources (two or more control light sources) (Akasaka, Col. 4, lines 9-20).

Regarding claim 13, Deguchi in view of Kosaka and Akasaka discloses all limitations as discussed in claim 7, further discloses a common circuits (e.g. common circuits inside controller, CONT of Fig. 4, Deguchi) each controlling simultaneously (e.g. by controlling pump A of optical direct amplifier 15A and pump B of optical direct amplifier 15B simultaneously, Fig. 4 of Deguchi).

Regarding claims 20-26, the limitations introduced by claims 20-26 correspond to the limitations introduced by claims 7-13, respectively. The treatment of claims 7-13 above reads on the corresponding limitations of claims 20-26.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Akasaka is cited to show related art in Raman amplification and its system and method. Kosaka and Deguchi are cited to show similar work in utilizing supervisory signal, control signal and control light in a repeater.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex H Chan whose telephone number is (703) 305-0340. The examiner can normally be reached on Monday to Friday (8am to 6pm EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Alex Chan
Patent Examiner
September 11, 2003

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600